

Changing Comparative Advantage and the Changing Composition of Asian Exports

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1. INTRODUCTION

RAPID economic growth in several Asian economies, particularly those from East and Southeast Asia, and subsequently in China and South Asia, has led to rapid structural transformation in these economies. If one takes a historical perspective, it was in accordance with what Kuznets (1966) and Chenery and Syrquin (1975) posited — in a growing economy the decline of the agricultural sector has generally been accompanied by strong expansion of the manufacturing and/or services sector. Transforming economic structure has had a direct bearing on the trade structure of the economy. Looking back three decades, one finds that in several Asian economies, the structural transformation has been more or less fundamental, *pari passu* these economies have experienced a dynamic process of changing comparative advantage. This entailed a rapid growth in their exports of manufactures as well as a changing structure of manufactured exports. In what follows, we will evaluate the process of transformation of economic structures and changes in the manufacturing sector in the Asian economies, followed by changes in comparative advantage resulting in higher product sophistication of exports with the passage of time.

2. GROWTH AND CHANGING ECONOMIC STRUCTURE

From Heckscher-Ohlin trade theory we would expect that changing economic structure and, therefore, changing factor endowments would result in shifts in the structure of trade in the following manner: The product composition of exports

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would shift from a predominance of natural resource intensive exports to unskilled labour intensive exports, further to physical and human capital intensive exports, and then on to technology and knowledge-intensive exports.

Table 1 illustrates this pattern. The agricultural sector in all sub-groups of Asian economies has dramatically declined. This change is most visible in the newly industrialising economies (NIEs), namely, Hong Kong, Korea, Singapore and Taiwan, where its proportion fell steadily from 16 per cent to four per cent of

TABLE 1
Changing Structure of Production, 1970–95
(Per cent of GDP)

		<i>Agriculture</i>	<i>Industry</i>	<i>Manufacturing</i>	<i>Services</i>
NIEs					
	1970	17	33	25	51
	1980	9	40	34	51
	1990	6	41	30	53
	1991	5	41	29	54
	1994	4	37	26	59
	1995	4	37	25	59
ASEAN4^a					
	1970	34	25	15	41
	1980	25	36	17	39
	1990	19	39	24	42
	1991	17	40	27	44
	1994	15	40	27	45
	1995	15	40	27	45
China, People's Republic of					
	1970	34	38	30	28
	1980	31	47	35	22
	1990	27	42	38	31
	1991	27	41	37	32
	1994	21	47	37	32
	1995	21	48	38	31
South Asia^b					
	1970	45	21	14	35
	1980	37	25	17	38
	1990	32	27	18	42
	1991	32	26	16	43
	1994	29	27	17	44
	1995	29	27	18	44

Notes:

^a Includes Indonesia, Malaysia, Philippines and Thailand

^b Includes Bangladesh, India, Nepal, Pakistan and Sri Lanka

Sources: World Bank, *World Development Report Vols. 1982, 1992, 1993, 1994, 1996 and 1997*, Washington DC. Council for Economic Planning and Development (Republic of China), *Taiwan Statistical Data Book 1996*.

GDP over the 1970–95 period. By the mid-1990s, the agriculture sector in the NIEs was reduced to the smallest in Asia. Share of manufactures in GDP in the NIEs first rose from 23 per cent to 30 per cent between 1970 and 1990. Subsequently, as the services sector expanded, the share of the manufacturing sector declined further to 25 per cent in 1995. In 1995, services was the largest sector, accounting for 59 per cent of GDP. Likewise, the four large ASEAN economies (Indonesia, Malaysia, the Philippines and Thailand) experienced the contraction of their agricultural sector to less than half its size between 1970 and 1995. However, unlike in the NIEs, the manufacturing sector in these economies continued to expand until 1991, after which it reached a plateau. The level of economic maturity in this sub-group of economies is less than that in the NIEs. Compared to the NIEs, the services sector recorded a smaller expansion in the ASEAN economies. According to ‘the flying geese paradigm’, China follows the ASEAN economies. This is visible in the structural transformation of the Chinese economy as well. The agricultural sector has contracted but less than in ASEAN. The industrial sector still dominates the Chinese economy. It accounted for 48 per cent of GDP in 1995. Although the manufacturing sector accounted for a greater part of the GDP, its expansion over the 1970–95 period has been less than that in the ASEAN economies. Similarly, the expansion of the services sector in China has been less than that in the ASEAN economies and the NIEs.

The agricultural sector has also shrunk in the South Asian economies as well, but expansion in their manufacturing sector has not been as remarkable as that in China and the other more successful Asian economies. The proportion of agriculture in GDP declined from 45 per cent to 29 per cent over the 1970–95 period, and manufacturing output rose from 14 per cent to 18 per cent over the same period. This minuscule increase portends to the slow pace of industrialisation in this sub-group of Asian economies. During the 1990s, the contribution of manufacturing did not increase at all. The declining share of the agricultural sector has been predominantly captured by the rising share of the services sector, which expanded, from 35 per cent to 44 per cent of GDP, making it larger than that in China and of comparable proportion to that in the ASEAN economies.

Overall then, in the NIEs and the ASEAN economies, structural transformation has been nothing short of radical. Over the 1980s, China also succeeded in transforming its economic structure substantially. However, South Asian economies were not able to keep pace with the other economic groups, which is not to imply that they also did not record structural transformation.

3. SIGNIFICANCE OF EXPORTS OF MANUFACTURES

Economic growth leads to structural transformation in the economy, which in turn ushers in transformation of the manufacturing sector which impinges upon

the trading pattern. In a developing economy, manufactured exports are valued for attributes that they are frequently believed to possess, some of which are also associated with export diversification, which in turn is known to provide greater stability of export earnings and the terms of trade. Generally, both income elasticity and price elasticity of global demand are presumed higher for manufactures than for traditional primary exports. The same applies to short-term supply elasticity of manufactured exports. Apart from the stabilising effects of diversification, the earnings from manufactured exports are *per se* more amenable to stable economic growth than those from exports of primary products. In addition, there are dynamic growth stimulating effects like learning effects, the realisation of scale economies and the creation of positive externalities associated with exports of manufactures. While there is some econometric evidence of more dynamic growth effects from manufactured exports, there is also evidence that manufactured exports may be the result rather than the cause of rapid growth (Bradford, 1994; Fosu, 1990; and Helleiner, 1995). Exports of manufactures also have short- and medium-term macroeconomic attributes. For instance, pressure to service debt and maintain international creditworthiness stimulates the need for structural reforms, including import and financial market liberalisation.

Exports of manufactures also enable a developing economy to move closer to international best practices as well as raise total factor productivity (TFP). The NIEs and, to an extent, the ASEAN-4¹ economies followed by China consciously promoted exports of manufactures. Typically, explanations of the links between TFP growth and exports of manufactures emphasise static factors. To be sure, static factors did account for the initial surges of productivity. However, they did not explain the continuing high TFP growth rates in Asian economies. The relationship between high TFP growth and exports of manufactures may well be the result of exporters' role in helping economies adopt and master international best-practice technologies. This can be classified as a dynamic factor. High levels of labour force cognitive skills permit better firm level adoption, adaptation, and mastery of technology. Thus, exports of manufactures and human capital development interacted to provide a particularly rapid phase of productivity-based catching up (World Bank, 1993).

It is well within the realm of possibilities that the move to higher production functions occurred before the growth of manufactured exports. But if it is assumed that domestic efforts, like plant reorganisation, were behind the spurt of manufactured exports, it stretches credulity to suggest that the large cumulative effects of TFP growth in the NIEs and the ASEAN-4 economies were achieved by shop-floor innovations and plant reorganisation (Pack and Page, 1993; and Ozawa, 1993). If this were the case, it would be difficult to explain why the TFP gains in some of the Asian economies outstripped productivity increases in the

¹ Indonesia, Malaysia, Philippines and Thailand.

TABLE 2
Exports of Manufactures as Per Cent of Total Exports, 1975–1996

	<i>Exports of Manufacturers^a as a Percentage of Total Exports</i>			
	<i>1975</i>	<i>1980</i>	<i>1990</i>	<i>1996</i>
NIEs	69.7	78.2	88.6	89.6
Hong Kong, China	74.3	96.0	94.9	94.2
Korea	81.6	90.2	93.8	89.4
Singapore	41.8	44.7	72.3	84.7
Taipei, China	81.3	88.2	93.5	94.2
ASEAN4	13.9	16.6	50.9	66.1
Indonesia	2.4	3.9	37.9	52.6
Malaysia	30.4	27.8	55.2	76.8
Philippines	16.3	23.5	40.9	43.6
Thailand	19.6	34.9	63.4	71.4
China, People's Rep. of	—	48.6	55.7	85.5
India	50.7	58.8	73.4	76.6 ^b

Notes:

^a Includes exports of chemicals, basic manufacturers, machines, transport equipment and miscellaneous manufactured goods.

^b Data refer to 1994.

Sources: Asian Development Bank, *Key Indicators of Developing Asian and Pacific Countries 1993* and *1997*.

industrial economies during their own rapid-growth periods, when TFP growth was attributable only to domestic factors. Apparently, an increased ability to tap world technology has been an important benefit of strong growth in manufactured exports.

As can be seen in Table 2, exports of manufactures have risen as a proportion of total exports. In the NIEs, they rose from almost 69 per cent in 1975 to almost 90 per cent in 1996. Hong Kong and Taiwan had over 94 per cent of their exports falling in the category of manufactured products in 1996. Although, the average proportion of manufactured products in total exports for the ASEAN-4 was 66 per cent in 1996, this proportion rose from 14 per cent in 1975. Thus, growth of manufactured exports in this country group was faster than that in the NIEs. Between 1980 and 1996, China nearly doubled its proportion of manufactured products in total exports. In 1996, they accounted for 85 per cent of total exports. The pace of similar change in India was slower, although 77 per cent of its exports in 1996 were manufactured products.

4. STRUCTURAL TRANSFORMATION OF THE MANUFACTURING SECTOR

An index developed by the United Nations Industrial Development Organisation (UNIDO) measures the change in the value-added share of 16

individual manufacturing sectors in total value-added of the industrial sector. It is a good measure of the rapidity of structural change over the period during which exports rapidly expanded in Asia. This index is given in Table 3, with the average annual growth rate of manufacturing value-added over this period. It is a measure of the degree of correlation between the value added shares in, say, 1960 and 1965 (taking the first column). If the correlation is high, then there is little structural change, and the index is low. Conversely, if the correlation is low, there is a lot of structural change and the index is high. What is noteworthy is that both expanding and shrinking branches of manufacturing activity contribute to the index.

Overall the values confirm the expected relationship between high rates of structural change within the manufacturing sector for the NIEs. There are quinquenniums of significant structural change in the manufacturing sector, like 1965–70, 1975–80 and 1990–95. For these periods, the values of the index are relatively higher than those for the other periods. There are also periods of slower structural change, like 1960–65 and 1970–75. What the index values establish is that the manufacturing sector in the NIEs has constantly remained in a state of flux and has gone on structurally transforming constantly. The average growth of manufacturing value-added in the NIEs has recorded a massive increase from an annual average of \$14,774 million for the 1970–75 period to an annual average of \$208,579 million for the 1990–95 period. Little wonder, these economies are presently on the verge of being classified as industrial economies. Korea became a member of the OECD (Organisation for Economic Co-operation and Development) club in 1996.²

In the case of China, the highest degree of structural change in the industrial sector, as denoted by the UNIDO index, was observed for the 1965–70 quinquennium. After this period the index plunged to a low level. It did not rise until the 1980–85 quinquennium, after which it stayed at a relatively high level, reflecting the ‘open door’ policy and modernisation of the manufacturing sector. Average growth of manufacturing value-added has showed a remarkable increase in China. It rose from an annual average of \$7,022 million for the 1960–65 period to \$87,525 million for 1985–90; during the 1990s, it increased by some 59 per cent. A large rural-urban migration of labour has taken place in China during the last decade-and-a-half. This caused a decline in average labour productivity over the 1980–90 period. In addition, a large and inefficient public sector has added to declining labour productivity.

In the ASEAN economies, structural change in the manufacturing sector was not significant until 1975. The values of the UNIDO index ranged between 4.87 for the 1960–65 period and 6.87 for the 1970–75 period. However, after 1975 the

² Labour productivity in the NIEs has also recorded a commensurate rise. According to the UNIDO statistics, value-added per worker in the NIEs increased from an annual average of \$4,616 during 1970–75 to \$26,843 during 1985–90.

TABLE 3
The UNIDO Index of Structural Change

	<i>Index of Structural Change^a</i> (5-year average in degrees)							<i>Manufacturing Value Added</i> (5-year averages) (\$ million)						
	1960–65	1965–70	1970–75	1975–80	1980–85	1985–90	1990–95	1960–65	1965–70	1970–75	1975–80	1980–85	1985–90	1990–95
NIEs	6.76	11.05	7.26	11.40	7.46	13.57	7.66	14,740	21,598	34,303	59,167	86,862	142,900	208,579
Hong Kong, China	7.68	11.55	12.54	12.60	6.64	13.39	19.67	2,349	3,616	4,775	8,366	10,664	11,976	9,989
Korea	12.10	13.81	16.77	14.85	14.74	14.34	8.64	2,450	5,589	12,419	25,885	39,267	73,273	125,661
Singapore	24.68	34.68	20.33	14.17	20.00	28.86	6.81	402	891	2,431	4,267	6,332	9,395	14,083
Taipei, China	5.49	10.30	17.78	11.97	6.41	14.70	9.77	9,538	11,502	14,678	20,650	30,598	48,255	58,846
China, People's Rep. of	3.06	71.31	5.29	6.55	15.02	10.39	15.22	7,022	13,227	42,847	50,096	64,676	87,525	138,905
ASEAN	4.87	5.87	6.28	13.59	10.47	16.71	12.76	7,137	8,880	13,538	20,080	26,501	41,149	76,534
Indonesia	4.12	7.37	19.56	24.43	14.22	27.14	25.16	899	998	1,709	2,533	4,620	9,807	20,321
Malaysia	7.71	7.65	24.32	8.54	27.62	20.34	15.04	671	972	1,710	3,240	4,790	6,537	13,145
Philippines	12.69	10.91	14.30	24.16	33.44	31.81	13.42	2,069	2,511	3,768	4,752	4,642	5,832	9,206
Thailand	5.31	10.58	6.24	12.53	9.67	21.63	11.08	3,497	4,398	6,352	9,554	12,448	18,974	33,862
South Asia	5.96	7.00	7.71	4.76	13.86	8.41	10.14	8,220	9,634	11,981	15,036	19,095	25,667	38,900
Bangladesh	3.18	19.84	14.31	12.96	19.66	21.80	10.69	461	639	504	721	1,044	1,377	2,079
India	6.83	9.50	7.24	6.36	14.14	8.75	11.44	6,952	7,734	9,621	12,128	14,601	19,468	29,925
Pakistan	8.74	8.45	11.36	16.30	16.83	22.17	14.75	730	1,145	1,656	1,851	2,759	3,974	5,834
Sri Lanka	6.52	18.99	23.33	26.17	21.75	22.32	15.85	77	116	199	337	692	847	1,062

Notes:

^a The measure for structural change is defined as:

$$\cos \theta = \frac{\sum_i s_i(t) \cdot s_i(t-1)}{\sqrt{(\sum_i s_i^2 t^2) \cdot (\sum_i s_i^2 (t-1)^2)}}$$

where $s_i(t)$ is the share of the i th branch in total manufacturing value added in the year t . The value can be interpreted as the angle between two vectors $s_i(t-1)$ and $s_i(t)$ measured in degrees.

Source: UNIDO data tapes.

index values rose sharply, denoting substantial structural changes in the manufacturing sector. Particularly large structural changes in the manufacturing sector occurred in Indonesia, Malaysia and the Philippines during the 1970-95 period, and in Thailand during 1985-90. Manufacturing value-added in ASEAN made impressive strides over the 1980-95 period. Value-added per worker in the manufacturing sector increased steadily from an annual average of \$3,309 during 1970-75 to \$8,388 during 1985-90. The data for the NIEs, ASEAN and post-1980 China seem to be consistent with the conclusion that high rates of growth and rapid structural change in the manufacturing sector go hand in hand. We shall see later that economies or groups of economies having above average rates of industrialisation and structural change in manufacturing sectors also have rapidly changing product composition of exports (Bradford, 1987).

Although the values of the structural change index in the manufacturing sector are not much lower for the South Asian economies than those for the NIEs and ASEAN, it does not imply that industrial sector growth has been as dynamic as in the other Asian country groups discussed above. It should be noted that the size of the industrial sector in the South Asian countries was, and continues to be, much smaller. This relative smallness is borne out by value of manufacturing value-added statistics in these economies (Table 3). Labour productivity recorded impressive gains, albeit from a low base. Value-added per worker went up from an annual average of \$1,757 during 1970-75 to \$4,104 during 1985-90. Thus, while some structural change did occur in the manufacturing sector in the South Asian economies, the manufacturing sector had a relatively low rate of growth.

5. TRANSFORMATIONS IN THE STRUCTURE OF MANUFACTURING SECTOR

Rapid economic growth and the absorption of new technology can alter relative factor endowments in an economy, which in turn changes the autarky prices of the factors of production as well as those of basic and intermediate inputs. This results in changes in comparative advantage of an economy in a Heckscher-Ohlin sense, resulting in changes in export structure. There is some empirical support for hypothesising the effects of changing factor endowments on export structure. For instance, Heller (1976) explained the changing structure of Japanese exports by changing factor endowments. Recently, Lee (1986) investigated changing export structures of Korea, Taiwan and Japan, using data for 1963 through 1977. He discovered that Korea and Taiwan, unlike Japan, did not generally export products with high levels of human and physical capital. However, over this period the commodity structure of Korean exports increasingly became capital intensive. Human-capital-intensive products were also added during this period. Over the same period, Taiwan exploited its comparative advantage in labour- and skill-intensive products.

It is well known that the NIEs' road to industrialisation and export success started with labour-intensive, low-technology manufactures. As investment in the physical stock of capital and human capital rose, as labour costs increased with the accumulation of skills and as exchange rates appreciated with economic maturation, relatively more sophisticated manufacturing activity expanded at the expense of labour-intensive manufactures. This is also evident from the sharp initial increase in the NIEs in the share of food, beverage and tobacco (19 per cent) output in total manufacturing output during the 1970s as well as that of textiles and clothing (21 per cent). By the early 1990s the share of these two labour-intensive sectors had declined to 10 per cent and 13 per cent, respectively. At the same time, the share of machinery and transport equipment in total manufacturing output grew in the NIEs from 15 per cent to 29 per cent over the 1970–92 period. In the case of Singapore, the share of chemicals in total manufacturing output has also risen rapidly (Pack and Page, 1993).

For the ASEAN economies, the production of agriculture-based, labour-intensive manufactured goods shrank with the shrinking of their agricultural sector. The share of food, beverages and tobacco in total manufacturing output declined from 44 per cent in 1970 to 24 per cent in the early 1990s. By contrast there has been a rapid expansion of less-agriculture-based but labour-intensive manufacturing. The textiles and clothing sector expanded from 10 per cent to 15 per cent of total manufacturing output. Machinery and transport equipment and other manufacturing recorded impressive increases in their shares in total output with the latter increasing from 30 per cent to 37 per cent over the same period.

China and South Asia share some common features in the structure of their manufacturing sector. In both the cases, the shares of food, beverages and tobacco have remained stable over this period and that of textiles and clothing have slipped. In China, the share of textiles declined from 17 per cent of total manufacturing output in 1981 to 11 per cent in 1992, whereas for South Asia it fell from 24 per cent in 1970 to 15 per cent in 1992. Both China and South Asia have a large and increasingly important machinery and transport equipment sector. Also, South Asia has a disproportionately large chemical sector and China's chemical sector is growing rapidly. In China the output of machinery and transport equipment expanded from 19 per cent of the total to 24 per cent over the 1981–92 period. In South Asia, it expanded from 17 per cent to 22 per cent in the period between 1970–92. The output of chemical sector expanded from one per cent of the total to seven per cent in China, while in South Asia it expanded from 13 per cent to 15 per cent. This points to an incongruity in the underlying comparative advantage predicted by Heckscher-Ohlin. It is intuitive to expect these countries to have a comparative advantage in labour-intensive textile and clothing industries and a comparative disadvantage in capital-intensive chemical as well as machinery and transport equipment industries. Part of the explanation

lies in the industrial policy pursued by China and India in the past. In both the cases, industrial policy was biased towards heavy industry, following the Soviet model of growth.

6. RESOURCE ENDOWMENT AND COMPARATIVE ADVANTAGE

In the foregoing discussion we first saw evidence of changing structural transformation, factor endowments and export structure in different groups of Asian economies, and then we saw how changing factor endowments changes export structure. These transformations have played an important role in determining the structure of exports at any point in time. This has also been established by Leamer (1984) and Song (1996), using Bayesian econometric techniques. Leamer (1984) grouped 61 2-digit SITC commodity classes into 10 aggregates, using trade data for 61 countries. Of these, two were primary product aggregates (petroleum and raw materials), four were crops (forest products, tropical products, animal products and cereals), and four were manufactured aggregates (labour intensive manufactures, capital intensive manufactures, machinery and chemicals). One characteristic that could be discerned from the correlation matrices was that there were, in general, negative correlations between net exports of manufactured aggregates and net exports of non-manufactured aggregates. This implies that success in exporting manufactured products is accompanied by increased imports of non-manufactured products.

A clear picture of the behaviour of manufactured aggregates along country lines was presented by sorting the signs of net exports of four manufactured aggregates. In so doing, another ladder of development was formed, displaying how countries have upgraded themselves along the development path. Although the ladder of development made by Leamer clearly reflected the changing pattern of world trade from the 1960s to the 1980s, it had a limited base. It was only based on the trade structure and was far from comprehensive because it did not include fundamental variables like GNP per capita, growth rates and important social indicators. Manufactured exports were arrayed to suggest a process of growth. It began with the export of aggregate 7 (labour-intensive manufactures), which required primarily unskilled workers. The next rung up the ladder was aggregate 8 (capital-intensive manufactures), which required capital. The more advanced countries which were abundant in capital and knowledge, stood at the top with export aggregates 9 and 10. These essentially included machinery and chemicals, respectively. Keeping our observations confined to the Asian economies, we find that in 1965 Hong Kong, Korea and Taiwan exported aggregate 7 and imported the others. China and India exported aggregates 7 and 8 and imported aggregates 9 and 10. The markets for exporting aggregates 8, 9 and 10 were dominated by the industrial economies. While the NIEs were showing

signs of taking-off, they began by exporting aggregate 7. The exception was Singapore, which was still at the bottom rung of the ladder in 1965. It is interesting to note that at this point in time, China and India ranked higher on the ladder because they exported aggregates 7 and 8.

By 1971, there were noticeable changes in the ladder. A number of countries moved up by exporting both aggregates 7 and 8 as well as by exporting aggregate 7 alone. For instance, while Hong Kong and Korea remained at their former levels, Taiwan achieved remarkable progress by exporting capital-intensive products within a short period of time. This trend of upgrading continued throughout the 1970s. By 1980, this trend became even more pronounced. Japan upgraded itself by decreasing exports of labour-intensive exports, while China came down the ladder because its capital-intensive exports fell. Korea and Taiwan stepped up their capital-intensive exports while India increased its labour-intensive exports. Singapore climbed several rungs by exporting both labour-intensive products and chemicals. The Philippines and Sri Lanka moved up one rung of the ladder by exporting labour-intensive products. By 1980, the NIEs and to an extent the three middle-income countries of Southeast Asia (Indonesia, Malaysia and Thailand) had distinguished themselves from the low-income developing countries by exporting capital-intensive and labour-intensive manufactures. In addition, they were competitive in several product ranges and had pushed the industrial economies out of these markets.

By 1988, the last year covered by Song (1996), export structures had changed further. Several Asian economies moved up the ladder by exporting labour and capital intensive products, pushing industrial countries out of these markets. A few countries, like Taiwan, were even exporting machinery and chemicals. Industrial economies were losing their exports of aggregates 7 and 8. These changes were far from smooth. Crowding of the markets of aggregates 7 and 8 caused serious adjustment problems for the industrial economies, though Japan had less serious adjustment problems because it was exporting all manufactured products except aggregate 10.

During the 1980–88 period, the exports of NIEs, the Southeast Asian countries and some low-income countries of Asia continued to expand. With the upgrading of the economies of Indonesia, Malaysia and Thailand, all the ASEAN countries moved up the ladder. China became a large exporter of labour-intensive products. This reflects the strong growth of East and Southeast Asian economies and the benefits they derived from the export-orientation of their policy stance. Taiwan made remarkable progress by exporting three out of four manufactured aggregates (labour and capital intensive and chemicals) and left Korea behind. Unlike China, India remained at the same position on the ladder as in the mid 1960s. This systematic movement of exports up the ladder and the process of upgrading adds to the evidence of progressive movement in comparative advantage already presented.

7. METAMORPHOSIS IN THE REVEALED COMPARATIVE ADVANTAGE

Comparative advantage is a dynamic concept. We saw in the preceding section that it is constantly in a state of flux. Casual empiricism indicates that the more rapid the GDP growth and the rate of technology absorption, the swifter are the changes in comparative advantage and progression of exports to up-market high-technology and knowledge-intensive products. Rapid growth in several Asian economies has brought about shifts in their comparative advantage. Some successful exporters among the Asian economies are no longer mere exporters of low-cost labour-intensive products that dominated their export basket not too long ago. Other than rapid growth and technological absorption, these economies have adopted the quality control procedures which have enhanced the competitiveness of their exports. The NIEs are presently exporting manufactured products on a global scale.

Evidence of structural shift in comparative advantage can be found in Table 4, which reports calculations of five different revealed comparative advantage (RCA) indexes for the Asian economies individually and in groups. RCA is defined as the ratio of exports in a given category to total exports of that country divided by the same ratio for the world economy. Table 4 reports values indicating comparative advantage in minerals, agricultural, technology, labour, capital and human capital intensive activity. A corollary of the flying geese paradigm is the existence of complementarity in the regional economies. It is confirmed by the fact that some countries have extremely high index values in certain categories while others have extremely low values. For instance, Indonesia and Malaysia maintained strong comparative advantage in mineral and agriculture intensive products during the 1980s. Thailand also had high index values for these categories, but they declined sharply in the 1990s. By contrast, Japan (data not shown in the Table) has an extremely low index value for these two categories, but a high index value for technology — and capital-intensive products. Secondly, a significant shift in comparative advantage away from labour-intensive products over the 1980s was recorded by the NIEs.

The 1993 index values for Hong Kong, Korea, Singapore and Taiwan were up to 50 per cent lower than their 1980 values. This change is also indicated by the NIEs' labour-intensive product index which fell from 4.26 to 1.77 over the same period. Logically, the large drop in the NIEs' labour-intensive product index coincided with an increase in technology — and capital-intensive product indexes. The value of their aggregate index moved from below one to above one in both categories, with a larger increase recorded for technology intensive activities. The RCA values for the South Asian economies have not been computed. For labour-intensive exports, they are likely to be higher than those for the ASEAN economies, and closer to those of China. Using RCA measures and correlation analysis, Cline (1990) also established that in the NIEs (except Hong

TABLE 4
Revealed Comparative Advantage Indexes for the Asian Economies

	<i>Mineral Intensive</i>		<i>Agricultural Intensive</i>		<i>Technology Intensive</i>		<i>Labour Intensive</i>		<i>Human Capital Intensive</i>		<i>Capital Intensive</i>	
	<i>1980</i>	<i>1993</i>	<i>1980</i>	<i>1993</i>	<i>1980</i>	<i>1993</i>	<i>1980</i>	<i>1993</i>	<i>1980</i>	<i>1993</i>	<i>1980</i>	<i>1993</i>
NIEs												
Hong Kong, China	0.06	0.19	0.14	0.24	0.44	0.85	6.69	3.28	1.37	0.75	0.86	0.81
Korea	0.11	0.29	0.75	0.41	0.62	0.93	4.96	2.18	1.44	1.20	0.99	1.04
Singapore	0.94	1.13	1.30	0.53	0.81	1.49	1.43	0.99	0.65	0.68	0.87	1.20
Taipei, China	0.08	0.13	0.95	0.60	0.74	1.25	5.24	2.05	1.05	0.74	0.88	1.04
China, People's Rep. of	0.53	0.43	0.81	0.72	0.39	0.45	4.96	4.06	0.83	0.55	0.59	0.49
ASEAN												
Indonesia	2.52	2.63	1.46	2.27	0.01	0.14	0.11	1.47	0.01	0.32	0.02	0.22
Malaysia	1.16	0.89	3.14	1.58	0.15	0.75	1.08	1.45	0.11	0.82	0.32	0.97
Philippines	0.74	0.55	2.97	1.42	0.10	0.39	2.26	2.94	0.12	0.19	0.13	0.40
Thailand	0.55	0.38	3.91	2.12	0.05	0.62	1.36	1.71	0.18	0.62	0.23	0.67
ASEAN Average	1.81	1.30	2.23	1.87	0.09	0.52	0.58	1.51	0.07	0.58	0.13	0.63
NIEs Average	0.32	0.47	0.84	0.48	0.74	1.20	4.26	1.77	1.10	0.86	0.90	1.06

Source: Bora (1996), Table 2.

Kong) and the ASEAN (except Indonesia) economic structures changed markedly during the 1965–84 period. In the process, these economies gained comparative advantage in first exporting several labour-intensive and subsequently capital-intensive items. Such changes, however, were not found to be significant in case of the South Asian countries.

There is empirical support for the effects of changing factor endowments on export structure. For instance, Heller (1976) explained the changing structure of Japanese exports by reference to changing factor endowments. Subsequently, Lee (1986), focused on examining the changing export structures of Korea, Taiwan and Japan, for the 1963–77 period. He asserted that Korea and Taiwan, unlike Japan, did not export products with high levels of human and physical capital. However, over the specified period, the commodity structure of Korean exports became more physical and human capital intensive, while Taiwan exploited its comparative advantage in labour or skill-intensive products.

In keeping with the 'ladder' principle, the NIEs were important exporters of labour-intensive products in the 1960s as the ASEAN economies were in the 1970s. In its simplest form, the ladder analogy implies that Asian economies or country groups are rapidly climbing a product sophistication ladder, as their export structures and products are moving up the rungs of a ladder. The bottom rung stands for having comparative advantage in labour-intensive unsophisticated products, while the top rung stands for technology — and knowledge-intensive products. This phenomenon is consistent with both a dynamic version of the Heckscher-Ohlin factor endowment model and the product life cycle theory.

As the NIEs moved up the rung and vacated their position as exporters of labour-intensive products, the ASEAN economies occupied it. Their labour-intensive exports continued over the 1980s. Between 1980 and 1993, the index for labour-intensive products for the ASEAN economies rose from 0.58 to 1.51. Part of this movement could be explained by (a) intra-Asian flows and (b) the growing investment of NIEs in the ASEAN economies. Of the two, the latter in particular contributed to the expansion of labour-intensive exports. As factor endowments changed and the factor costs increased in the NIEs, lower cost and lower skilled activities were diverted towards the ASEAN region first, and subsequently to China. The latter held its position as a net exporter of labour-intensive products until the early 1990s. Its relatively high RCA in that category of products fell over the years from 4.95 to 4.06, yet remained the highest figure in the region. China and the ASEAN member economies competed in the exports of several labour-intensive products because their product ranges partly coincided.

The movement up the ladder can be expected to vary in accordance with differing factor endowments. Accordingly, the resource-abundant ASEAN economies can be expected to move through a natural resource processing phase that was less strongly observed in Korea and Taiwan. Their movement into

capital, skill and knowledge-intensive exports may be somewhat delayed. In addition, the rungs of the product sophistication ladder may not be evenly spaced. In the dynamic process of moving on different rungs, an economy may secure a foothold on two rungs. No economy remains static on a rung. Looking at two-digit SITC exports of various Asian economies for 1986, Pearson (1996) identified several interesting features. They are as follows: (1) The natural resource-rich ASEAN-4 economies had relatively large export shares in natural-resource based manufactures, that is, SITC 63 (wood products), SITC 66 (non-metallic manufactures) and SITC 68 (non-ferrous metals). (2) The traditional items of textiles (65) and clothing (84) were important for all the Asian economies in his sample, although in different proportions. Footwear (85) was important for Korea and Taiwan, and to a lesser extent for China and Thailand. (3) Likewise, the 'basket' category (89) which included toys, sporting goods, jewelry and musical instruments was also important for most of the Asian economies. (4) For some Asian economies, non-traditional exports had become significant. For instance, non-electrical machinery (71) had become important for Singapore and Taiwan, and electrical machinery (72) for all the other Asian economies except Indonesia. (5) Over 1965–86, both wood products and textiles lost market share for Korea, with gains registered in electrical machinery and transportation equipment. (6) In Taiwan, textiles and wood products lost market share, while non-electrical machinery, footwear and miscellaneous manufactures (89) made strong percentage-point gains.³ This brings home the changing mix of comparative advantage and, therefore, exports.

In 1996, SITC categories 74, 75 and 76 became the most important for Singapore, Korea, Malaysia, China and Taiwan, in that order. Hong Kong also had substantial exports in these three SITC categories. These stand for electronics exports like PCs, semiconductors, colour televisions, VCRs, office-automation machines, and other sophisticated electronics gazettes. Thus, several Asian economies succeeded in acquiring comparative advantage in technology and knowledge intensive export lines. Until 1991, China did not record large exports in these categories, but after that they soared at a very high rate. This represents upward movement of these economies on the product sophistication ladder. Although the methodology employed by Berri and Ozawa (1997) is different, they make a similar case of changing comparative advantage and export structure of Asian economies. To prove their case, they use different SITC categories of exports from the Asian economies to the United States over the 1978–1992 period.

Constantly changing comparative advantage in these economies has brought about transformations in the pattern of their intra-trade as well. Shinohara (1997) noted that the pattern of intra-trade in machines, other than transport equipment,

³ The numbers in parentheses stand for the SITC category.

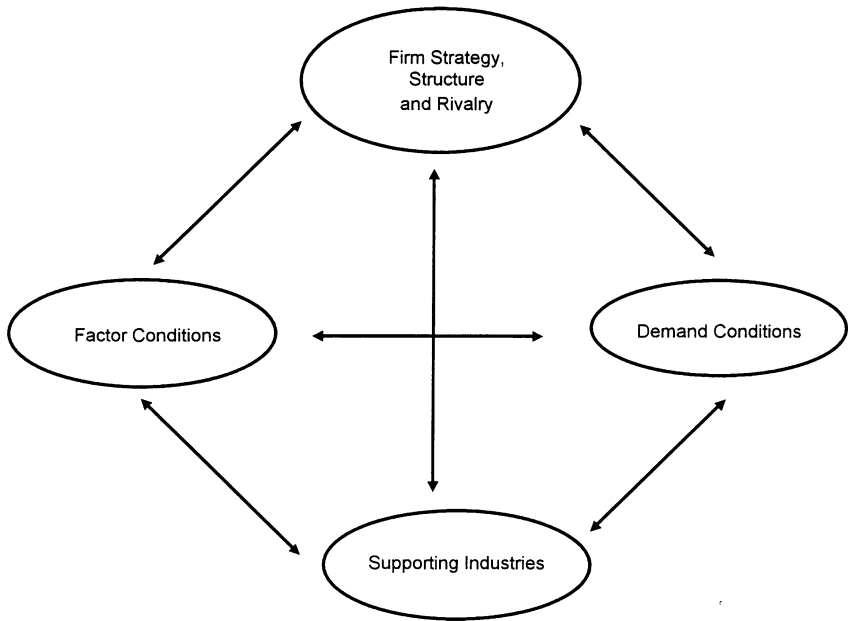
has undergone a remarkable change. In 1995, the machinery exports of Malaysia, the Philippines and Thailand to Japan were approximately one-third of machinery exports of Japan to them. This is a striking change from the situation in 1985, when the proportion of machinery which Japan imported from these countries ranged between three and eight per cent of the machinery which Japan exported to them. Similar transformations have also occurred in intra-trade between the NIEs and the three ASEAN economies. In 1980, the machinery (excluding transport equipment) which the three ASEAN economies exported to the NIEs was 39 per cent of the machinery the NIEs exported to the ASEAN economies. In 1992, this ratio jumped to 97 per cent. In the case of Malaysia, the machinery exported to the NIEs exceeded that imported from the NIEs by about 36 per cent. These transformations in comparative advantage were given an impetus by the trade liberalisation measures adopted in these economies and by the post-Plaza Accord appreciation of the yen.

During the mid-1990s, an interesting mix of overlapping comparative advantage has emerged, which is giving rise to a new kind of export competition. The NIEs are increasingly exporting goods that directly compete with some Japanese exports in third markets. The ASEAN economies, particularly Malaysia and Thailand, are exporting more products that directly compete with the NIEs in the third markets. These countries, in turn, are facing greater competition from the other developing economies within Asia, like China, and outside Asia, like the emerging economies of Latin America and Eastern Europe. As income levels in Asia rise, demand for basic consumer goods will become increasingly strong in the Asian economies in the medium-term. As the size of the markets increase, so will the level of competition. This implies that the successful exporting economies of Asia will progressively diminish their dependence on the Japanese and US markets in the medium term. This is a plausible scenario. If it comes to be, these economies will be increasingly concerned about skills base, deregulation and productivity to enhance their competitiveness against one another as well as against other developing economies. In addition, the hollowing out of low value-added sectors will continue in the NIEs, while the shift to high-value-added sectors may not be so swift, resulting in deceleration of export growth.

8. TRANSFORMING COMPETITIVE ADVANTAGE

By linking micro- and meso-level competencies and economic strengths, Porter (1990) developed the concept of competitive advantage, which determines the trading capabilities of nations. According to him, success and competitive advantages of industrial clusters are shaped by inter-economy variations in four components of the national business environment. These are: (a) factor conditions which include 'created' factor endowments such as human skills, knowledge,

FIGURE 1
The National Competitive Advantage Diamond



technology, infrastructure and natural factor endowments, (b) demand conditions i.e. the absolute level of demand, and qualitative considerations such as the sophistication and expectations of consumers, (c) firm strategy, structure and rivalry, and (d) related and supporting industries with both vertical and horizontal linkages (see Figure 1).

These components form Porter's 'diamond' and continually influence and interact with each other. National differences in each of these elements promote the growth of particular industrial clusters over others, and thereby stimulate growth of particular lines of exports. Related industrial clusters exploit the advantages of their business environment and contribute to the success of the national economy. The Asian illustration of successful exploitation of business environment are the NIEs and the four large ASEAN economies. This process has also begun in China. To the above, Porter added some supportive factors. One is government which has a bearing on educational provision, research and development, infrastructural investment, and the promotion of competition. The diamond links economic success, export growth and the pattern of global rivalry with domestic economic conditions and the founding of specific industrial clusters. Porter posited that countries progress by upgrading their competitive position in the global economy, through the achievement of higher order

advantages in existing export industries and development of export capabilities in new, high-productivity, high value-added industries.

Porter's refinement of the principle of comparative advantage includes the following three stages of export expansion: (a) the factor-driven stage, (b) the investment-driven stage, and (c) the innovation-driven stage. By the late 1970s, the four NIEs had passed through the factor-driven stage and were turning towards the investment-driven stage. In this stage firms construct modern efficient and often large-scale facilities, which they equip with the best technology to be bought in international markets. Work skills are enhanced alongside product quality and processes. Factor conditions and firm strategy and structure synergise to produce competitive advantage, which in turn results in successful export performance. With these developments, industrial structure is geared for export markets, or import substitution. However, those industries which emerge as particularly successful industries on the export front, do gain strength from domestic demand conditions (Fitzgerald, 1994).

Several of the Asian economies have successfully developed industrial clusters that manufacture high value-added products, and these have benefited a great deal from the keen competition in the domestic markets. These industries are no longer limited to the NIEs. Countries like Malaysia have successfully developed very high value-added clusters in electronics. The semiconductor industry cluster in Malaysia is state-of-the-art-technology and is globally competitive. Other ASEAN economies and China are in the factor-driven stage and have several internationally competitive industries that draw their advantage from basic factors of production, such as natural resources or a readily available, semi-skilled, labour pool. However, these economies seem to be on their way to going beyond the factor-driven stage and entering the investment-driven stage. The deterrents which they are currently facing are work skills and product quality, but in spite of these, as in the first group of Asian economies, the second group seems to be gearing up for organising industrial clusters with globally competitive organisational capabilities. Indications are that the progressive creation of competitive industrial clusters is following the old flying geese paradigm in the Asian economies.

9. SUMMING-UP

A good deal of evidence is available to conclude that with rapid growth, the economic structure of the NIEs, ASEAN, China and to a lesser extent the South Asian economies underwent structural transformation, which had a direct bearing on factor endowments. Growth, structural transformation and changing factor endowments also ushered in transformation in the manufacturing sector. The Heckscher-Ohlin theory supports and provides an explanation for the resulting

transformations in the comparative advantage of different Asian economies and/or country groups. In addition, evidence abounds to show that exports of manufactures from the NIEs, ASEAN, China and the South Asian economies not only increased rapidly during the last three decades but their product sophistication level also went on rising.

Since the early 1960s, the product composition of exports of the fast growing Asian economies has shifted from predominantly natural resource intensive exports, to unskilled labour intensive exports, further to physical and human capital intensive exports, and then to technology and knowledge intensive exports. Of the total NIEs' exports in 1996, almost 90 per cent fell into the category of manufactured products. For the ASEAN economies this proportion is 66 per cent, while that for China is 86 per cent. The UNIDO index, which denotes structural change in the manufacturing sector, confirms high rates of structural change. For the ASEAN economies, values of the index rose sharply after 1975.

Revealed comparative advantage indexes also provided evidence of a shift in the comparative advantage of Asian economies. A large drop in the NIEs' labour-intensive products coincided with an increase in the index for technology and capital intensive products. The comparison of RCA values revealed the existence of complementarity in the Asian economies. Changes in comparative advantage can be likened to the upward movement of the economies on a ladder. As factor endowments changed and NIEs moved up a rung the ASEAN economies occupied it. They in turn were followed by China, which held its position as net exporter of labour-intensive products for a long time, while the South Asian economies were on the rung below.

Comparison of principal two-digit SITC product categories also reveals upward movement of Asian economies on the product sophistication ladder. By the mid-1990s, several Asian economies, particularly the NIEs, acquired comparative advantage in sophisticated, technology and knowledge intensive products. Again the ASEAN economies followed the NIEs. Thus, one can conclude that a great deal of evidence is available that shows that structural transformation and changing factor endowments have caused transmutations in the structure of exports in the fast growing Asian economies. Evidence is also available to show that success in exporting manufactured products is accompanied by increased imports of non-manufactured products. With changing comparative advantage, interesting transformations occurred in the pattern of intra-trade among the Asian economies as well as in export competition in third country markets.

Using Porter's concept of competitive advantage, we can say that the NIEs have gone beyond the factor-driven stage in their exports and are well into the investment-driven stage. The ASEAN countries are on their way to developing the industrial clusters that have competitive advantage in high value-added products, although they are facing some deterrents. In Porter's parlance we can

say that the four large ASEAN economies are in the factor-driven stage and are fast moving towards the investment-driven stage. China, a successful Asian exporter, is still in the factor-driven stage.

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